

Ochiai & Co.

Registered Patent Attorneys in Japan
for Patents, Utility Models, Trade Marks and Designs

10/571739
IAP9 Rec'd PCT/PTO 14 MAR 2006

TO Building
6-3, Taiko 2-chome
Taiko-ku, Tokyo 110-0016
JAPAN

Phone: (03)5807-6727
Facsimile: (03)5807-6728
e-mail@ochiaipatent.com

OCB-226-A

Date: March 10, 2005

PCT OPERATIONS DIVISIONS
THE INTERNATIONAL BUREAU OF WIPO
34, chemin des Colombettes
1211 Geneva 20
Switzerland

Our ref. 16-369

**Via facsimile (41-22)740.14.35
& courier**

"Amendment of the claims under 19(1) (Rule 46)"

Re: International Application No. PCT/JP2004/014582
Applicants: HONDA MOTOR CO., LTD. et al
Agents: OCHIAI Takeshi & NIKI Kazuaki
International Filing Date: 04.10.2004 (4th October 2004)

Dear Sirs,

The applicants, who received the International Search Report relating to the above identified International Application transmitted on 11.01.2005, hereby file Amendment under Article 19(1) as in the attached sheets.

The applicants hereby cancel sheets Nos. 25 and 26, and submit herewith new sheets Nos. 25 and 26 for replacement, because the intended amendment is to amend claims 1 and 2 on file. More specifically, claim 1 is amended to include some additional features therein. Claim 2 on file is amended for conformance in wordings to that of the amended claim 1. The remaining claim 3 on file is held as it stands now.

Very truly yours,

Kazuaki Niki
for Takeshi Ochiai (OCHIAI Takeshi)
Registered Patent Attorney in Japan
of Ochiai & Co.

Attachment:

(1) Amendment under Article 19(1) 2 sheets

English
translation
Cop 4 of Amendment filed under Article 19(1) and Theor

CLAIMS

[1] (amended) An automatic parking brake system comprising: a parking piston (23, 103) which is slidably fitted into a casing (22, 102) and has a parking control fluid pressure chamber (28, 106) defined between a rear face of the parking piston (23, 103) and the casing (22, 102) so that a parking brake state can be obtained by forward movement in response to a parking control fluid pressure acting on the parking control fluid pressure chamber (28, 106); a lock mechanism (25, 105) having a lock piston (24, 104) which is slidably fitted into the casing (22, 102) so as to be capable of advancing or retreating relative to the parking piston (23, 103), has a parking release control fluid pressure chamber (44, 109) defined between a front face of the lock piston (24, 104) and the casing (22, 102), and is urged forward by a spring (48, 114), the lock mechanism (25, 105) automatically locking in response to forward movement of the parking piston (23, 103) in order to mechanically lock the parking piston (23, 103) at a forward position and unlocking in response to a parking release control fluid pressure acting on the parking release control fluid pressure chamber (44, 109); a fluid pressure source (10C; 10A, 10B); and fluid pressure control means (56; 66A, 66B) for controlling a fluid pressure generated by the fluid pressure source (10C; 10A, 10B) so that the parking control fluid pressure and the parking release control fluid pressure can be obtained and separately controlled.

[2] (amended) The automatic parking brake system according to Claim 1, wherein the lock piston (24, 104) of the lock mechanism (25, 105) is positioned at the rear side of the parking piston (23, 103) so that a forward urging force acts on the lock piston (24, 104) at least when the parking piston (23, 103) moves forward, and is provided so as to allow a parking release control pressure to be made to act on the lock piston (24, 104) toward the rear, and the lock mechanism (25, 105) further comprises a cylindrical retaining tube (51) integrally and coaxially connected to a rear part of the parking piston (23, 103); spheres (52) retained at a plurality of positions in the peripheral direction of the retaining tube (51) so that the spheres (52) can move along the radial direction of the retaining tube (51); and an insertion shaft

(53) inserted into the retaining tube (51) so that the insertion shaft (53) can move axially relative to the retaining tube (51) and connected integrally to the front end of the lock piston (24, 104) so as to be in contact with the spheres (52) from the inside of the retaining tube (51); a large diameter hole portion (21c, 101b) having a larger diameter than that of the retaining tube (51) and a small diameter hole portion (21d, 101c) being formed on an inner face of the casing (22, 102) between the parking piston (23, 103) and the lock piston (24, 104) so that a forward-facing annular latching step (21g, 101f) is interposed between the large diameter hole portion (21c, 101b) and the small diameter hole portion (21d, 101c), the small diameter hole portion (21d, 101c) being formed so as to have a smaller diameter than that of the large diameter hole portion (21c, 101b) and be able to be inserted into the retaining tube (51) and being disposed to the rear of the large diameter hole portion (21c, 101b); and the insertion shaft (53) being formed by coaxially and integrally connecting a front small diameter shaft portion (53a) and a rear large diameter shaft portion (53b) via a tapered step (53c) that is capable of changing the position of contact of each of the spheres (52) between the small diameter shaft portion (53a) and the large diameter shaft portion (53b), the small diameter shaft portion (53a) being in contact with each of the spheres (52) so as to be capable of putting each of the spheres (52) in rolling contact with an inner face of the small diameter hole portion (21d, 101c) in a state in which the parking piston (23, 103) is at a retreat limit, and the large diameter shaft portion (53b) being connected coaxially to the small diameter shaft portion (53a) so as to be capable of pushing each of the spheres (52) outward along the radial direction of the retaining tube (51) in order to make the spheres (52) contact the large diameter hole portion (21c, 101b) in response to the parking piston (23, 103) moving forward from the retreat limit and the lock piston (24, 104) moving forward.

[3] The automatic parking brake system according to either Claim 1 or Claim 2, wherein an adjustment mechanism (82) is provided within a brake caliper (75) forming a brake fluid pressure chamber (80), a brake piston (78) being slidably fitted

into a cylinder hole (76) of the brake caliper (75) and having a rear face facing the brake fluid pressure chamber (80), the adjustment mechanism (82) comprising an adjustment nut (83) connected to the brake piston (78) so that relative rotation is not possible and housed in the brake fluid pressure chamber (80), an adjustment bolt (84) having a front end part screwed into the adjustment nut (83), a relay piston (85) disposed in a rear part of the brake fluid pressure chamber (80) and slidably fitted into the brake caliper (75) in a liquid-tight manner so that the relay piston (85) cannot rotate around the axis but can move in the axial direction, and a small piston (86) integrally and coaxially connected to a rear part of the adjustment bolt (84), slidably fitted into the relay piston (85) in a liquid-tight manner, and resiliently urged in a direction in which the small piston (86) frictionally engages with the relay piston (85), the parking piston (103) abutting against the relay piston (85) from the rear side and being slidably fitted into the casing (102) connected to the brake caliper (75), and the lock mechanism (105) being provided within the casing (102) to the rear side of the parking piston (103).

Ochiai & Co.

Registered Patent Attorneys in Japan
for Patents, Utility Models, Trade Marks and Designs

TO Building
6-3, Taiko 2-chome
Taiko-ku, Tokyo 110-0016
JAPAN

Phone: (03)5807-8727
Facsimile: (03)5807-8728
e-mail: ochiai@ochiaipatent.com

OCB-226-A

PCT OPERATIONS DIVISIONS
THE INTERNATIONAL BUREAU OF WIPO
34, chemin des Colombettes
1211 Geneva 20
Switzerland

Date: March 10, 2005

Our ref. 16-369

*Via facsimile (41-22)740.14.35
& courier*

"Amendment of the claims under 19(1) (Rule 46)"

Re: International Application No. PCT/JP2004/014582
Applicants: HONDA MOTOR CO., LTD. et al
Agents: OCHIAI Takeshi & NIKI Kazuaki
International Filing Date: 04.10.2004 (4th October 2004)

Dear Sirs,

The applicants, who received the International Search Report relating to the above identified International Application transmitted on 11.01.2005, hereby file Amendment under Article 19(1) as in the attached sheets.

The applicants hereby cancel sheets Nos. 25 and 26, and submit herewith new sheets Nos. 25 and 26 for replacement, because the intended amendment is to amend claims 1 and 2 on file. More specifically, claim 1 is amended to include some additional features therein. Claim 2 on file is amended for conformance in wordings to that of the amended claim 1. The remaining claim 3 on file is held as it stands now.

Very truly yours,

Kazuaki Niki
for Takeshi Ochiai (OCHIAI Takeshi)
Registered Patent Attorney in Japan
of Ochiai & Co.

Attachment:

(1) Amendment under Article 19(1) 2 sheets

請求の範囲

- [1] (補正後) ケーシング (22, 102) に摺動可能に嵌合され、その背面および前記ケーシング (22, 102) 間にパーキング制御用液王室 (28, 106) を画成し、該パーキング制御用液王室 (28, 106) へのパーキング用制御液王の作用に応じた前進作動によってパーキングブレーキ状態を得ることを可能とするパーキングピストン (23, 103) と、該パーキングピストン (23, 103) に対して進退可能なようにして前記ケーシング (22, 102) に摺動可能に嵌合され、その前面および前記ケーシング間 (22, 102) 間にパーキング解除用制御液王室 (44, 109) を画成すると共に前方に向けてはね (48, 114) 付勢されるロックピストン (24, 104) を有し、前記パーキングピストン (23, 103) を前進位置で機械的にロックすべく前記パーキングピストン (23, 103) の前進作動に応じて自動的にロック作動するとともに前記パーキング解除用制御液王室 (44, 109) へのパーキング解除用制御液王の作用に応じてロック解除作動するロック機構 (25, 105) と、液王発生源 (10C; 10A, 10B) と、該液王発生源 (10C; 10A, 10B) の発生液王を制御して前記パーキング用制御液王および前記パーキング解除用制御液王を得ることを可能とし、且つそれらパーキング用制御液王およびパーキング解除用制御液王を個別に制御可能な液王制御手段 (56; 66A, 66B) とを備えることを特徴とする自動パーキングブレーキ装置。
- [2] (補正後) 前記ロック機構 (25, 105) の前記ロックピストン (24, 104) は、少なくとも前記パーキングピストン (23, 103) の前進作動時には前方に向けての付勢力が作用するようにして前記パーキングピストン (23, 103) よりも後方側に位置してパーキング解除用制御王を後方に向けて作用せしめるように設けられ、前記ロック機構 (25, 105) は更に、前記パーキングピストン (23, 103) の後部に一体かつ同軸に連設された円筒状の保持筒 (51) と、該保持筒 (51) の周方向複数箇所に保持筒 (51) の半径方向に沿う方向への移動を可能として保持される球体 (52) と、前記保持筒 (51) に軸方向相対移動可能に挿入されて前記各球体 (52) に保持筒 (51) の内方側から接触するようにしてロックピストン (24, 104) の前端に一体に連設される挿入軸 (53) とを備え、前記パーキングピストン (23, 103) および前記ロックピストン (24, 104) 間で前記ケーシング (22, 102) の内面には、前記保持筒 (51) よりも大径の大径孔部 (21c, 101b) と、前記保持筒 (51) を挿入可能として前記大径孔部 (21c, 101b) よりも小径に形成されつつ大径孔部 (21c, 101b) よりも後方に配置される小径孔部 (21d, 101c) とが、前方に臨む環状の係止段部 (21g, 101f) を相互間に挟むようにして形成され、前記挿入軸 (53) は、前記パーキングピストン (23, 103) が後退限にある状態で前記各球体 (52) を前記小径孔部 (21d, 101c) の内面に転がり接触させ得るようにして各球体 (52) に接触する前方側の小径軸部 (53a) と、前記パーキングピス

トン(23, 103)が後退限から前進するとともに前記ロックピストン(24, 104)が前進するのに応じて前記各球体(52)を前記大径孔部(21c, 101b)に接触せしめるべく保持筒(51)の半径方向に沿う外方側に押し上げることを可能として前記小径軸部(53a)に同軸に連なる後方側の大径軸部(53b)とが、前記各球体(52)の接触箇所を小径軸部(53a)および大径軸部(53b)間で変化させることを可能としたテーパ状の段部(53c)を介して同軸にかつ一体に連設されて成ることを特徴とする請求項1記載の自動パーキングブレーキ装置。

[3]

ブレーキキャリパ(75)が備えるシリンダ孔(76)に摺動自在に嵌合されるブレーキピストン(78)の背面を臨ませるブレーキ液王室(80)を形成するブレーキキャリパ(75)内に、前記ブレーキピストン(78)に相対回転不能に連結されて前記ブレーキ液王室(80)に収納される調整ナット(83)と、該調整ナット(83)に前端部が螺合される調整ボルト(84)と、前記ブレーキ液王室(80)の後部に配置されるとともに軸線まわりの回転を不能としつつ軸線方向の移動を可能として前記ブレーキキャリパ(75)に液密にかつ摺動自在に嵌合される中継ピストン(85)と、前記調整ボルト(84)の後部に一体にかつ同軸に連設されて前記中継ピストン(85)に液密にかつ摺動自在に嵌合されるとともに前記中継ピストン(85)に摩擦係合する方向に弾発付勢される小ピストン(86)とを備えるアジャスト機構(82)が設けられ、前記ブレーキキャリパ(75)に連設された前記ケーシング(102)に、前記中継ピストン(85)に後方側から当接する前記パーキングピストン(103)が摺動可能に嵌合され、前記ロック機構(105)が、パーキングピストン(103)よりも後方側で前記ケーシング(102)内に設けられることを特徴とする請求項1または2記載の自動パーキングブレーキ装置。